




DECLARATION

I, Sun YOU of 168-32, Seongbuk-gu, Seongbuk 1(il)-dong, Seoul, Republic of Korea declare that I have a through knowledge of the Korean and English language and the writings contained in the following pages are correct translation of the attached Korea Patent Application No. 10-2002-0055404.

This 23th day of November 2005

BY 

Sun YOU



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Application Number: Patent Application No. 2002-0055404

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Applicant(s): LG Electronics Inc.

COMMISSIONER

[ABSTRACT OF THE DISCLOSURE]**[ABSTRACT]**

A system and method of managing a radio bearer in a mobile communication system releases assigned radio bearer in a state of maintaining Packet Data Protocol (PDP) Context information to a subscriber's Packet Session.

This improves efficiency of use of the radio bearer. Also, in case a user desires to interrupt the service temporarily, the PDP context is preserved. Thus, it is possible to prevent fees associated with an undesired service from being charged, thereby decreasing overall fees to subscribers.

[TYPICAL DRAWING]

FIG. 3

[INDEX WORDS]

source, PDP context



[SPECIFICATION]

[TITLE OF THE INVENTION]

METHOD OF MANAGING RADIO BEARER IN MOBILE
COMMUNICATION SYSTEM

5 **[BRIEF DESCRIPTION OF THE DRAWINGS]**

FIG. 1 is a block diagram illustrating a general packet mobile communication system;

FIG. 2 is a signal flow chart illustrating a related-art process of setting Radio Access Bearer (RAB) Release Request to release a radio bearer for a packet data
10 protocol (PDP) context preservation function of a GPRS packet service; and

FIG. 3 is a signal flow chart illustrating the process of preserving a packet data protocol (PDP) context according to one embodiment of the present invention.

Reference numerals of the essential parts in the drawings

31: mobile communication terminal (MS) 32: UTRAN
15 33: serving GPRS support node (SGSN)
34: gateway GPRS support node (GGSN)

[DETAILED DESCRIPTION OF THE INVENTION]**[OBJECT OF THE INVENTION]****[FIELD OF THE INVENTION AND DISCUSSION OF THE RELATED ART]**

20 The present invention generally relates to a mobile communication system, and more particularly, to a method of managing a radio bearer of a mobile communication system for enhancing efficiency in using radio source.

FIG. 1 is a block diagram illustrating a general packet mobile communication system, and a method for allocating and releasing a radio bearer in the aforementioned
25 general packet mobile communication system will now be explained.

In order to receive a general packet radio service (hereinafter referred to as 'GPRS') of the packet service, a packet service subscriber registers his own location in a serving GPRS support node (hereinafter referred to as 'SGSN') 13 via a mobile station (hereinafter referred to as 'MS') 11.

5 Upon registering the location of the subscriber via the MS 11, the SGSN 13 takes service information of the subscriber from a home location register (hereinafter referred to as 'HLR') 14. The SGSN 13 then performs the process for activating a Packet Data Protocol (hereinafter referred to as 'PDP') context to set a Packet Session.

10 At this time, a radio source is assigned between the MS 11 and UTRAN 12 according to the desired quality of service (QoS). The allocation and release function of the radio source is performed by the UTRAN 12.

15 When setting the Packet Session by the process for activating the PDP context, the packet service is provided to the MS 11. Next, if the subscriber desires to terminate the service, the SGSN 13 deactivates the PDP context by the process for deactivating the PDP context, and releases the assigned radio source.

At this time, the GPRS packet service performs a PDP context Preservation function according to rarity and importance of the radio bearer.

20 According to the PDP context Preservation function, the UTRAN 12 judges the necessity of releasing the radio bearer in case of User Inactivity or temporary cut-off of the radio bearer, and releases the radio bearer temporarily by an communicative operation with the SGSN 13.

25 FIG. 2 is a signal flow chart illustrating the process of setting Radio Access Bearer (RAB) Release Request to release the radio bearer for the PDP context preservation function of the GPRS packet service. If the User Inactivity or the temporary cut-off of the radio bearer is detected by the UTRAN 12, it sends the RAB

Release Request message to the SGSN 13 (S201). At this time, it is possible to request releasing the plurality of radio bearers simultaneously.

The SGSN 13 receiving the RAB Release Request message sends a RAB Assignment Request message to the UTRAN 12 to release the radio bearer (S202).

5 Therefore, a radio bearer is released between the UTRAN 12 and the MS 11 (S203), and the released radio bearer may be used in service for another subscriber.

Then, the UTRAN 12 sends a RAB Assignment Response message to the SGSN 13 to respond the RAB Release Request message. At this time, information for re-setting the radio bearer is maintained.

10 For receiving the packet service again following the PDP context preservation, the subscriber has to send a Service Request message to the SGSN 13 via the MS 11 to request the allocation of the radio bearer.

In the related art method of managing the radio bearer in the mobile communication system, the PDP context preservation function is performed according
15 to the UTRAN 12 without determination of the subscriber. That is, the UTRAN 12 periodically checks the User Inactivity. When the User Inactivity generates for a predetermined time period, the radio bearer is released and the PDP context is preserved.

Thus, until the UTRAN 12 checks the User Inactivity, the radio bearer cannot be used for another, which results in wasting the radio bearer.

20 The time period for maintaining the packet service is longer than that for maintaining a general circuit service of telephone communication network, so that the user may want to intentionally discontinue the service due to various reasons. For instance, the user may desire to discontinue the packet service due to the cut-off of the packet service by web server connection and e-mail, call or urgent business during
25 receiving the packet service.

However, in the related art method of managing the radio bearer in the mobile communication system, the PDP context preservation function is performed according to the UTRAN 12 without determination of the subscriber. Therefore, the user has to deactivate the PDP context in order to terminate the service, which substantially
5 decreases the efficiency of use of the radio bearer.

[TECHNICAL TASKS TO BE ACHIEVED BY THE INVENTION]

An object of the present invention is to provide a system and method of managing a radio bearer in a mobile communication system that substantially obviates one or more problems due to limitations and disadvantages of the related art.

10 Another object of the present invention is to provide a system and method of managing a radio bearer in a mobile communication system, in which the radio bearer is released in a state of maintaining Packet Data Protocol (PDP) Context information to a subscriber's Packet Session, thereby improving efficiency of use of the radio bearer.

To achieve these and other objects and advantages of the present invention, a
15 method of managing a radio bearer in a mobile communication system includes: a first step of transmitting a Preserve PDP Context Request message corresponding to a service interruption session to a SGSN; a second step of receiving the Preserve PDP Context Request message requests the release of the radio bearer corresponding to the service interruption session to the UTRAN after the first step, by the SGSN; a third step
20 of releasing a radio bearer assigned in the corresponding MS requesting a packet service interruption via a subscriber's MS, by the UTRAN; a fourth step of transmitting a Response message for the radio bearer release result to the SGSN after the third step from the UTRAN; and a fifth step of transmitting a Preserve PDP Context Accept message to the MS from the SGSN.

25 Preferably, the Preserve PDP Context Request message is comprised of a

Protocol discriminator, a Transaction ID, a Preserve PDP Context Request message ID, a Session Management (SM) cause value, a Tear Down indicator.

More preferably, the Preserve PDP Context Accept message is comprised of a Protocol discriminator, a Transaction ID, and a Preserve PDP Context Accept message ID.

It is to be understood that both the foregoing general description and the following detailed description of the present invention are exemplary and explanatory and are intended to provide further explanation of the invention as claimed.

[PREFERRED EMBODIMENTS OF THE INVENTION]

A method of managing a radio bearer in a mobile communication system according to one embodiment of the present invention will be described with reference to the accompanying drawings.

In case a subscriber desires to interrupt a packet service temporarily, the method of managing the radio bearer in the mobile communication system according to the present invention includes the process steps of transmitting a Preserve PDP Context Request message to a SGSN 43 for preserving the packet via the subscriber's own MS 41, releasing a radio bearer, and the SGSN 43 responding to the Preserve PDP Context Request message by transmitting a Preserve PDP Context Accept message to the MS 41.

Next, tables 1 to 4 show preferred message types and message structures according to the Preserve PDP Context Request message and the Preserve PDP Context Accept message. The message type may follow a form used in a Session Management Protocol of 3GPP, which is explained in greater detail in 3GPP Technical Specifications TS 24.008 and TS 24.007, the contents of which are incorporated by reference herein.

Table 1 shows a message format of the Preserve PDP Context Request message.

[Table 1]

| IEI | Information Element | Type | Presence | Format | Length |
|-----|---|------------------------|----------|--------|-------------|
| | Protocol discriminator | Protocol discriminator | M | V | 1/2 |
| | Transaction ID | Transaction ID | M | V | 1/2 ~3/2 |
| | Preserve PDP context request message ID | Message type | M | V | 1 |
| | SM cause | SM cause | M | V | 1 |
| | Tear down indicator | Tear down indicator | O | TV | 1 |

Table 2 shows a preferred message format of the Preserve PDP Context Accept message.

[Table 2]

| IEI | Information Element | Type | Presence | Format | Length |
|-----|--|------------------------|----------|--------|-------------|
| | Protocol discriminator | Protocol discriminator | M | V | 1/2 |
| | Transaction ID | Transaction ID | M | V | 1/2 ~3/2 |
| | Preserve PDP context accept message ID | Message type | M | V | 1 |

Table 3 shows preferred bit values of the Preserve PDP Context Request message and the Preserve PDP Context Accept message according to the PDP preservation.

[Table 3]

| Session Management Message | Bit Value |
|--------------------------------------|-----------|
| Preserve PDP Context Request message | 01010111 |
| Preserve PDP Context Accept message | 01011000 |

Table 4 shows a preferred form of the SM (Session Management) cause value to the temporary service interruption.

[Table 4]

| SM Cause Value | Bit Value |
|-----------------|-----------|
| User Inactivity | 01110000 |

In this embodiment, the SM cause value uses a User Inactivity value and the Preserve PDP Context Request and the Preserve PDP Context Accept messages may be used for releasing the radio bearer while the user maintains the packet service in the MS

41, which are managed in the MS 41.

A method for preserving the PDP context according to an embodiment of the present invention will now be described with reference to FIG. 3.

FIG. 3 is a signal flow chart illustrating the process of preserving a packet data
5 protocol (PDP) context according to one embodiment of the present invention. In case the subscriber of the packet service desires to temporarily interrupt the service during using the service, the subscriber transmits the Preserve PDP Context Request message to the SGSN 33 via the subscriber's own MS 31 (S301).

At this time, the message format of the Preserve PDP Context Request message
10 is shown in the above Table 1. The SM cause value is used of "01110000 (User Inactivity)", a cause value for the temporary service interruption.

In the Preserve PDP Context Request message, the Teardown Indicator serves as a flag for preserving all corresponding PDP contexts if the plurality of PDP contexts exist in the required service.

15 After receiving the Preserve PDP Context Request message, the SGSN 33 analyzes the Preserve PDP Context Request message and then transmits a RAB (Radio Access Bearer) Assignment Request message for releasing the RAB(s) of the corresponding PDP context to a UTRAN 32. This results in commanding release of the RAB(s) (S302).

20 The UTRAN 32 releases the radio bearer between the UTRAN 32 and MS 11 (S303), and preferably simultaneously transmits a RAB Assignment Response message to the SGSN 33 for responding to the request for releasing the radio bearer (S304). At this time, information required for re-setting the RAB is maintained.

After releasing the corresponding radio bearer(s) through the aforementioned
25 process, the SGSN 33 transmits the Preserve PDP Context Accept message to the MS 31.

Thus, it is notified that information of the PDP context for the packet session of the subscriber is preserved, and the radio bearer(s) are released (S305).

The service interruption process is completed by request of the subscriber via the MS 11 of the subscriber.

5 **[EFFECT OF THE INVENTION]**

The method of managing the radio bearer in the mobile communication system according to the present invention therefore has at least the following advantages.

First, the PDP context preservation function is performed according to the request of the service subscriber, so that there is no need to wait for the detection of the
10 User Inactivity by the UTRAN. In other word, it is possible to prevent the radio bearer from being wasted, which thereby improves efficiency of the radio bearer as well as overall system efficiency.

Also, in case the user desires to interrupt the service temporarily, the PDP context is preserved. Thus, it is possible to prevent the fee of the undesired service from
15 being charged, which in turn, decreases overall fees to the subscriber.

The foregoing embodiments and advantages are merely exemplary and are not to be construed as limiting the present invention. The present teaching can be readily applied to other types of apparatuses. The description of the present invention is intended to be illustrative, and not to limit the scope of the claims. Many alternatives,
20 modifications, and variations will be apparent to those skilled in the art.

In the claims, means-plus-function clauses are intended to cover the structures described herein as performing the recited function and not only structural equivalents but also equivalent structures.

What is claimed is:

1. A method of managing a radio bearer in a mobile communication system wherein a mobile station itself can release a radio source being allocated to itself while
5 maintaining a Packet Data Protocol Context message.

2. A method of managing a radio bearer in a mobile communication system, comprising:

a first step of transmitting a Preserve PDP Context Request message
10 corresponding to a service interruption session to a SGSN;

a second step of receiving the Preserve PDP Context Request message requests the release of the radio bearer corresponding to the service interruption session to the UTRAN after the first step, by the SGSN;

a third step of releasing a radio bearer assigned in the corresponding MS
15 requesting a packet service interruption via a subscriber's MS, by the UTRAN;

a fourth step of transmitting a Response message for the radio bearer release result to the SGSN after the third step from the UTRAN; and

a fifth step of transmitting a Preserve PDP Context Accept message to the MS from the SGSN.
20

3. The method of claim 2, wherein the Preserve PDP Context Request message includes a Protocol discriminator, a Transaction ID, a Preserve PDP Context Request message ID, a Session Management (SM) cause value, and a Tear Down indicator.

25 4. The method of claim 5, wherein the Preserve PDP Context Accept message

comprises a Protocol discriminator, a Transaction ID, and a Preserve PDP Context Accept message ID.



DRAWINGS

FIG. 1

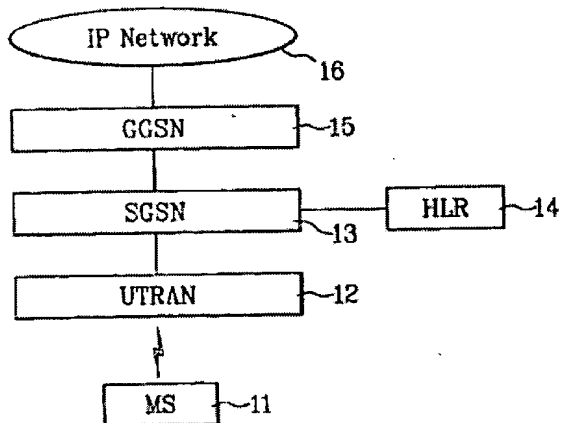


FIG. 2

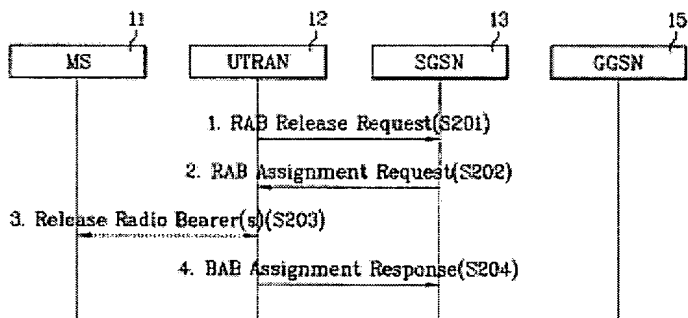


FIG. 3

